

60. *A Study on the Genus "Parapachydiscus,"* HYATT.

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Ammonites belonging to the genus *Parapachydiscus*, HYATT, are common in the *Pachydiscus*-Beds of Hokkaidô and Saghalien (Senonian in age); among the ammonites already reported from the Cretaceous of Hokkaidô by Messrs. M. YOKOYAMA, K. JIMBO and our two, the following ten species are duely referable to *Parapachydiscus*: *P. ariyalurensis* STOL., *P. naumanni* YOK., *P. sutneri* YOK., *P. abeshinaiensis* YABE (Ms. nom.=*P. denisonianus* of JIMBO, non STOLICZKA), *P. haradai* JIMBO (juvenile specimen: *P. yokoyamai* JIMBO), *P. teshioensis* JIMBO, *P. subtililobatus* JIMBO, *P. koluturensis* STOL., *P. fascicostatus* YABE and *P. rotalinoides* YABE. The collections of the Geological Institute, Tôkyô Imperial University, and the Institute of Geology and Palaeontology, Tôhoku Imperial University, contain several other species of this genus derived from the two islands, Hokkaidô, and Saghalien, most of which are apparently new; but for the present purpose, it is necessary to refer to only four of these forms, *P. menu* FORBES, *P. kossmati* YABE, *P. karafutoensis* YABE and SHIMIZU, and *P. mamiyai* YABE and SHIMIZU.

The species of *Parapachydiscus* enumerated above, are found to be classified into the following six groups:

1. Group of *P. gollevillensis*. (*P. gollevillensis* D'ORB., the type, not represented in our materials);
P. karafutoensis YABE and SHIMIZU.
2. Group of *P. kossmati*. *P. kossmati* YABE (the type).
3. Group of *P. haradai*. *P. haradai* JIMBO (the type), *P. teshioensis* JIMBO.
4. Group of *P. fascicostatus*. *P. fascicostatus* YABE (the type), *P. koluturensis* STOL. (?), *P. sutneri* YOK. (?).
5. Group of *P. naumanni*. *P. naumanni* YOK. (the type), *P. ariyalurensis* STOL., *P. subtililobatus* JIMBO.

Intermediate in form between the third and fifth groups; ribs narrow, crowded and almost straight. Suture-lines as in the fifth group.

5. Group of *P. naumanni*.....*Neopachydiscus*, nov.

Considerably increased in inflation of shell and decreased in the breadth of umbilicus; aperture lunate; surface-sculpture as in *Mesopachydiscus*. Suture-lines: similar to *Parapachydiscus* s.s.

6. Group of *P. mamiyai*.....*Epipachydiscus*, nov.

Shell like *Parapachydiscus* s.s. in form and sculpture. Suture-lines: external part as in *Pseudopachydiscus*, but with l_1 l_2 l_3 erect.

7. Group of *P. menu*.....*Menuites*, SPATH.

Shell like *Neopachydiscus* in form; surface with distant ribs and two rows of tubercles, one along the umbilical margin and the other along the ventral. Suture-lines: as in *Mesopachydiscus*, but minor incisions all around both the saddle and lobes being deep.

Noteworthy is the gradual transition in outline of shells recognised among the ammonites belonging to the second, third and fourth groups, the shells varying from widely umbilicated, compressed discoidal form of the second group to narrowly umbilicated, much inflated form of the fourth group. Suture-lines show likewise a gradual change, corresponding to that of shells, the relative length of L_1 to (L) increasing and gradually acquiring erect position from the second group through the third to the fourth. The ammonites of the second group being the geologically oldest and these of the fourth the youngest, the morphological changes outlined above are perhaps evolutionary, and hence the subdivisions of *Parapachydiscus*, here proposed, at least partly, may represent mere stages of development in phyletic series. In this sense, *Pseudo*-, *Meso*-and *Neopachydiscus* cannot be regarded as good subgenera in biological sense; but these names are believed certainly to be useful and convenient for stratigraphical purpose.

Dr. SPATH's genera, *Eupachydiscus*, *Canadoceras* and *Novakites*,²⁾ seem to cover some of the types here distinguished; but generic diagnosis and especially descriptions of suture-lines are not yet sufficiently given of none of his new genera, and we found great difficulties in applying these names to the Japanese materials at our disposal.

1) The following symbols are used by us for elements of suture-lines: (L) and (S) for the siphonal lobe and saddle, L_n and S_n for the external lobes and saddles, (l), l_n and s for the lobes and saddles of the internal part of suture-lines, n being numerals representing order of sequence from the siphonal, or antisiphonal, line to the umbilical suture.

2) L.F. SPATH: On the Senonian Ammonite Fauna of Pondoland. Trans. R. Soc. South Africa, 10, pt. 3, (1922).